Remarks

This is in response to the Office Action dated December 13, 2004. The Office Action first rejected claims 1-32 under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Office Action next rejected claims 1-7, 10, 20-27 and 32 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,616,349 to Li et al. ("Li"). The Office Action next rejected claims 1, 5, 13 and 17 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,785,473 to Sasaki et al. ("Sasaki"). The Office Action next rejected claims 8-9, 28 and 30 35 U.S.C. §103(a) as being unpatentable over Li in view of U.S. Patent No. 6,256,431 to Mesh ("Mesh") or U.S. Patent No. 6,278,818 to Laming et al. ("Laming"). The Office next rejected claim 11 under 35 U.S.C. §103(a) as being unpatentable over Li in view of U.S. Patent No. 5,854,698 to Eskildsen et al ("Eskildsen"). The Office Action next rejected claims 12, 14, 16 and 18-19 under 35 U.S.C. §103(a) as being unpatentable over Li in view of U.S. Patent No. 6,509,986 to Mizrahi ("Mizrahi"). The Office Action next rejected claim 15 under 35 U.S.C. §103(a) as being unpatentable over Li in view of U.S. Patent No. 5,572,612 to Delavaux et al. ("Delavaux"). Finally, the Office Action rejected claims 29 and 31 under 35 U.S.C. §103(a) as being unpatentable over Li in view of U.S. Patent No. 6,616,348 to Barnard ("Barnard").

Applicants have amended the specification to include the serial number of the referenced copending U.S. patent application. Applicants have also made clarifying amendments to claims 1-32 to delete the word "architecture" from those claims and replace that term with "network." Applicants have further amended claims 1, 12, 16, 17, 18, 20 and 32 to correct various informalities outlined in the rejection under 35 U.S.C §112, second paragraph.

In response to the rejections under 35 U.S.C §102, applicants have amended claims 1 and 20 to more particularly point out and distinctly claim the invention.

1. Amendments to the Specification

Applicants have provided a replacement paragraph to paragraph [01] at page 1, lines 1-5 to add the serial number of the copending patent application referenced in that paragraph.

2. Rejection: 35 U.S.C. §112

The Office Action rejected claims 1-32 under 35 U.S.C. §112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. However, the Office Action only provides detailed rejections of claims 1, 12, 16, 17, 18, 20 and 32. Applicants assume that claims 2-11, 19 and 21-31 were rejected as being dependent upon rejected claims. If this assumption is incorrect, Applicants request any rejection of any of the dependent claims be pointed out with particularity.

Claims 1, 13, 16, 18, 20 and 32 were rejected as having terms that lacked the proper antecedent basis. In response, applicants have amended each of these claims to ensure that each of the identified terms now has the appropriate antecedent basis.

Claim 17 was rejected as containing an unclear phrase, specifically "wherein one of said plurality of corresponding WDM receivers detects data packets is sent upstream." Applicants have amended this phrase to delete the word "is", which was a typographical error. Thus, the phrase now reads, in part, "detects data packets sent upstream."

As a result of the foregoing amendments, claims 1-32 now comply with the requirements of 35 U.S.C. §112, second paragraph. Accordingly, Applicants request the withdrawal of this rejection.

3. Rejection: 35 U.S.C. §102(e) - Li .

The Office Action next rejects claims 1-7, 10, 20-27 and 32 under 35 U.S.C. §102(e) over the Li reference. In order for a claim to be anticipated by a reference under 35 U.S.C. §102, that reference much teach each element of that claim. For the following reasons, Li fails to teach each of the elements of claims 1-7, 10, 20-27 and 32, as those claims have been amended.

The Li reference is directed to a two-fiber ring architecture that is capable of carrying multiple wavelength channels and allowing client self-healing in the event of single point failures. The architecture of that reference includes a two-fiber optical ring carrying at least one wavelength channel, wherein the wavelength channel has working traffic and protection traffic. The architecture also includes a first client networking element connected to the optical ring by a first pair of 2x2 add drop matrices and a second client networking element connected to the

optical ring by a second pair of 2x2 add drop matrices. At least one interconnect node is also provided when more than one ring is used. The interconnect node as taught by Li has a first and a second 2x2 interconnect matrices. The first interconnect matrix routes working traffic and the second routes protection traffic.

The present application teaches a WDM ring network architecture wherein the only carrier signals generated in the network originate from a single Network Node (NN). Selected wavelengths from a carrier signal form a virtual ring that operates independently of other virtual rings formed by different wavelengths of light. The NN forms and sends along the feeder ring (1) downstream data packets, (2) 'optical chalkboard' packets . . . and (3) control bits or signals." As is shown in FIG. 1 and as is described at page 6, paragraph [29], the NN has WDM sources and receivers and functions to send WDM signals along the feeder ring to Access Nodes (ANs) which have, for example, Waveguide Grating Routers (WGRs). Pairs of ports in the WGRs define distribution loops in which a single wavelength, forming a distribution ring, can be accessed by one or more End Stations (ESs). The WGSs act, for example, as static Optical Add-Drop Multiplexers (OADMs) that demultiplex the wavelengths on the feeder ring and directs them to users connected to ESs on the distribution ring and then multiplex wavelengths back onto the feeder ring.

Thus, as is shown in FIGs 2A and 2B and as is described in the associated description beginning at page 7, paragraph [32], optical signals are sent for example, in a unidirectional fashion from the NN along the feeder ring to ANs where selected wavelengths are demultiplexed for distribution to ESs via the distribution rings. The aforementioned optical chalkboard packets are, for example, packets generated at the NN that consist of, illustratively, all 1's. If permitted to do so (e.g., as indicated in the aforementioned control bits in the packet stream) a user terminal connected to the ESs modifies these optical chalkboard packets to modulate data from a user onto the carrier. The modulated signal is then amplified by, for example, a semiconductor optical amplifier (SOA), before being multiplexed and transmitted back along the distribution ring. Those signals are then combined again by the WGR at the AN and then forwarded in the upstream direction to other ANs and, ultimately, the NN.

<u>Claims 1 and 20</u>: Independent claims 1 and 20 each contain substantially the same elements except that claim 1 is directed to a network comprising "a fiber optical feeder ring" and

claim 20 is directed to a network comprising "a pair of counter-propagating fiber optical feeder rings." Claims 1 and 20 each claim:

> A WDM fiber optical ring network for communicating information in a metro access area using one or more wavelengths, which can be shared by a plurality of user terminals, comprising:
>
> [a fiber optical feeder ring (Claim 1)/a pair of counter-propagating fiber optical feeder rings (Claim 20)];
>
> at least one fiber optical distribution ring;
>
> a network node (NN) for providing the only optical carrier signals transmitted across said optical feeder ring and said at least one fiber optical distribution ring;
>
> at least one access node (AN) for permitting only selected wavelengths of said optical carrier signals to be transmitted along said at least one fiber optical distribution ring, said network node and said at least one access node connected via said [fiber optical feeder ring (Claim 1)/pair of counter-propagating fiber optical feeder rings (Claim 20)]; and
>
> at least one end station (ES) connected via said [fiber optical distribution ring (Claim 1)/at least one ring in said pair of counter-propagating fiber optical distribution rings (Claim 20)] to said at least one access node, wherein a user terminal in said plurality of user terminals is attached to said at least one end station.

Thus, claims 1 and 20 have each been amended to claim that the network node provides the only optical carrier signal used by the feeder and distribution ring(s) and that the access node permits only selected wavelengths of said optical carrier signals to be transmitted along said distribution ring.

<u>Access Node is Not Taught By The Li Reference</u>: The Office Action rejects claims 1 and 20 stating, in part, that the access node of claims 1 and 20 is taught by device 50 in FIG. 2 of the Li reference. Applicants disagree that the Li reference anticipates claims 1 and 20 as those claims have been amended.

Device 50 is shown in FIG. 2 of the Li reference as an "interconnect node" between two ring networks. However, as described at column 5, lines 10-26 of the Li reference, interconnect node 50 has a plurality of interconnect matrices for each wavelength channel. Interconnect node 50 photonically routes the working traffic, as described in Li, from a first client to a second client. A second interconnect node routes protection traffic from the second client to the first client. Thus, the interconnect nodes contemplated by the Li reference are nodes to route all signals from one ring to a second ring.

This is very different from the Access Nodes as claimed in claims 1 and 20. As discussed above, the ANs shown in FIG. 1 and described at page 6, paragraph [29], utilize Waveguide Grating Routers (WGRs) to create distribution loops, thus forming a ring in which only selected wavelengths are transmitted to one or more End Stations (ESs). As further described above and in the specification, the WGSs act, for example, as static Optical Add-Drop Multiplexers (OADMs) that demultiplex the wavelengths on the feeder ring and direct them to user terminals connected to ESs on the distribution ring and then multiplex wavelengths back onto the feeder ring. The interconnect nodes of the Li reference do not perform this multiplexing function and merely serve to connect one ring network to another to facilitate the routing of whatever traffic is on one ring to another ring. Thus, the Access Node as claimed in claims 1 and 20, as amended is not taught by the Li reference.

<u>Network Node is Not Taught by the Li Reference</u>: The Office Action also rejects claims 1 and 20 stating in part that the network node of claims 1 and 20 is taught by device 21 in FIG. 2. Applicants disagree.

As is discussed above, the Network Node (NN) contemplated by the present application and claimed in claim 1 is the only source of an optical carrier signal in the network of FIG. 1 of the present application. This signal is propagated and delivered along a ring network (claim 1) or a pair of counterpropagating ring networks (claim 20) to ANs for further distribution to End Stations (ESs) and to user terminals connected to ESs.

The access client 21 of FIG. 2 of the Li reference is simply one of many optical signal carrier generation devices in the network of FIG. 2. In particular, as is well-known, in typical optical WDM networks, optical carriers are generated by devices and data is modulated onto those carriers. Each wavelength is then multiplexed with different wavelength carriers for transmission across the network. When the signal reaches a destination, such as access client 40 in FIG. 2 of the Li reference, that client, or a multiplexer associated with that client, demultiplexes the carrier waves and demodulates the data from the carrier. To transmit data from access client 40, that client will then generate another carrier signal and modulate data onto that signal of an appropriate wavelength and then multiplexes that modulated signal with other carrier signals for further transmission in the network. In the network of FIG. 2 there is no single network node generating a carrier for all ring networks in that figure. Thus, the Network Node as claimed in claims 1 and 20 is not taught by the Li reference.

End Station Is Not Taught by the Li Reference: The Office Action relies on the cited device 32 of FIG. 2 of the Li reference as anticipating the End Station (ES) as claimed in claims 1 and 20. Applicants disagree. Device 32 is described in the Li reference as being an interoffice client which serves as an end point of a communication with one or more other clients, which are either interoffice clients or access clients. Applicants cannot locate any further description of the functionality of client 32 of the Li reference.

The ES of the present application and claimed in claims 1 and 20 functions to receive the wavelengths transmitted along a distribution ring by the AN, as described above. The Li reference does not teach an ES, client, or other device connected to such an AN. Accordingly, the End Station as claimed in claims 1 and 20 is not taught by the Li reference.

For the foregoing reasons, the cited portions of the Li reference do not teach all elements of claims 1 and 20. As a result, claims 1 and 20 are not anticipated by Li and, therefore, claims 1 and 20 are allowable over Li. It follows that claims 2-19 and 21-32 are allowable over Li as being dependent upon an allowable base claim.

4. Rejection: 35 U.S.C. §102(e) - Sasaki.

The Office Action next rejects claims 1, 5, 13 and 17 under 35 U.S.C. §102(e) over the Sasaki reference. Once again, in order for a claim to be anticipated by a reference under 35 U.S.C. §102, that reference much teach each element of that claim. For the following reasons, Sasaki fails to teach each of the elements of claims 1, 5, 13 and 17.

Sasaki teaches a WDM network in general having a plurality of nodes and a plurality of sub-networks. The general teaching of Sasaki involve methods of fault detection and correction in a WDM network, which may be a ring network, as discussed in Sasaki at column 3, line 61 – column 4, line10.

Claim 1:

Feeder Ring and Distribution Ring Are Not Taught by the Sasaki Reference: The Office Action relies on network 302 of FIG. 3 of Sasaki as teaching the optical feeder ring of claim 1 and further relies on network 303 of FIG. 3 as teaching the optical feeder ring of claim 1. However, as is clearly shown in FIG. 3 of Sasaki, network 303 is a subnetwork of network 302 and is not a separate network, ring or otherwise.

As is clearly shown in FIG. 2 of the present application, and as discussed above, the feeder ring is a ring that is separate from the distribution ring and are not subnetworks of the feeder rings. While the feeder and distribution rings may be modeled as a single ring for a particular wavelength of light, even in such a model the distribution rings are not subnetworks of the feeder rings. Thus, the cited networks of Sasaki are not the same as the feeder and distribution rings as claimed in claim1.

Network Node and Access Node Not Taught by the Sasaki Reference: The Office Action relies on device 312 and device 314 of FIG. 3 of Sasaki as teaching the network node and the access node of claim 1, respectively. However, device 312 is only mentioned as being one of the nodes in the network of FIG. 3, with no other description provided as to any functionality of the AN that might teach the claimed network node of claim 1, as described above. Similarly, device 314 is only referenced in that "nodes 314 and 316 (detect) the fault exchange information each other (sic), and determine and auxiliary path to recover the partial fault lightwave path in the sub-network 302." This does not teach the access node as claimed in claim 1 and as discussed above.

For these reasons, the cited portions of the Sasaki reference do not teach all elements of claim 1. As a result, claim 1 is not anticipated by Sasaki and, therefore, claim 1 is allowable over Sasaki. It follows that claims 2-19 are allowable over Sasaki as being dependent upon an allowable base claim. As claims 20-32 are not rejected over Sasaki, those claims are also allowable over this reference.

Conclusion:

Applicants have made clarifying amendments to claims 1-32 to correct various typographical amendments in those claims. Applicants have further amended claims 1, 12, 16, 17, 18, 20 and 32 to correct various informalities outlined in the rejection under 35 U.S.C §112, second paragraph.

In response to the rejections under 35 U.S.C §102, applicants have amended claims 1 and 20 to more particularly point out and distinctly claim the invention. For the foregoing reasons, neither Li nor Sasaki teach all elements of claims 1 and 20, as amended. Therefore, claims 1 and 20 are allowable over both of those references. It follows that claims 2-19 and 21-32 are allowable as being dependent upon an allowable base claim.

Applicant requests allowance of all claims.

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